Environmental Sciences

THE EVALUATION OF AQUATIC BIOMONITORS FOR SOURCE WATER PROTECTION

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This project is part of the deployment of a stand-alone, stream-side water quality monitoring station (WQMS) incorporating both physical/chemical and biological water quality monitoring technologies with data telemetry, data analysis, and water sampling capabilities on the Ohio River at the Thomas More College Biology Field Station. This pilot station will provide needed information regarding design and other technical issues for stream-side WQMSs to be incorporated into later work resulting in a water quality early warning system (EWS) network of WQMSs strategically placed throughout the Ohio River watershed for the protection of source water resources. Photosynthetic activity can be measured using Pulse Amplitude Modulated (PAM) fluorometry. In the present study PAM fluorometry is used to measure the photosynthetic activity of the green alga *Pseudokirchneriella subcapitata* upon exposure to varying concentrations of cyanide. *P. subcapitata* is one of four organisms being tested by the United States Environmental Protection Agency (USEPA) as potential bioindicators of water quality in the Ohio River watershed. *P. subcapitata*, along with *Lepomis macrochirus, Daphnia magna, and Corbicula fluminea* will eventually be placed *in situ* at various sites along the Licking and Ohio rivers to continuously monitor the quality of the water. Data telemetry will allow researchers in an EPA laboratory to have real-time access to the data. Presently, baseline responses are being established in laboratory conditions so that researchers can set critical values for behavioral endpoints. When these critical values are breached, an alarm is sent to the laboratory and the risk assessment begins. In this study, *P. subcapitata* was exposed to four different concentrations of cyanide. The results of this cyanide-induced algal inhibition were used to calculate an LC-50 (the lethal concentration for 50% of individuals). This, along with further testing, will be used to establish a critical value at which these *in situ* monitoring systems will alarm.